Development Targets and Efficiency in Improving Education and Health Outcomes in Mexico's Southern States

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I. Introduction

In September 2000, the Millennium Declaration was approved at the United Nations (U.N.). The declaration provides ambitious development targets—the so-called Millennium Development Goals (MDGs)—for the reduction of poverty and hunger, the improvement of education and health indicators, and progress in other areas such as gender equality and environmental sustainability. Unlike Mexico as a whole, the south (that is, the states of Chiapas, Guerrero, and Oaxaca) may well not reach many of the MDGs. The objective of this Note is to document this assertion and discuss some of the constraints toward reaching the MDGs, as well as some initiatives recently taken to make faster progress.

In the first section of the Note, we provide a brief diagnostic regarding how much progress has already been achieved toward reaching the MDGs in Mexico as a whole and in the south, and in some cases (for example, for poverty) we estimate how much additional progress is likely to be achieved in the years ahead. Thereafter, we focus on the question of whether improvements in efficiency in the provision of basic services would help in improving outcomes in the south, with a focus on health and education. Finally, we discuss the existing evidence on the impact that programs such as the Education, Health, and Nutrition Program (*Programa de Educación, Salud y Alimentación*—PROGRESA) have had on progress toward reaching some of these goals.

The main conclusions are as follows:

- **Will Mexico and especially the southern states reach the MDGs?** Preliminary estimates suggest that while Mexico as a whole may be able to reduce extreme poverty by half by 2015, the southern states will need to sustain high growth scenarios to achieve the same result. At the country level, reducing malnutrition rates by half and achieving universal primary school completion could well be achieved, but the reduction of infant and child mortality by two thirds may be more of a challenge, as is the case in other countries. Beyond the issue of reaching targets, there is ample evidence that the southern states are lagging behind the rest of the country in many indicators, so specific efforts will be needed to enable the south to progressively catch up with the country as a whole. As discussed below, well-targeted human development programs are part of the answer.

[1] We are grateful to Gladys Lopez-Acevedo for providing part of the data used in the efficiency analysis of this Note and to Corinne Siaens for estimating future poverty measures under alternative scenarios.

- **Do the difficulties in the south result from a lack of resources or a lack of efficiency?** To complement the analysis presented in the Education and Health Notes, we have performed a state-level analysis to determine whether the lower values for a range of indicators in the south result from a lack of resources or from a lack of efficiency in using existing resources.

    - **Lack of resources.** While the analysis suggests that most of the lag observed in the south results from a lack of resources, not all resources matter equally. We consider as "resources" a few key determinants of infant and child mortality, net primary and secondary school enrollment, and test scores in primary school. A higher per capita gross domestic product (GDP) should improve health indicators, but not by much, and it may not have much impact on education outcomes. Broad-based per capita spending on education or health also seems to have little impact (suggesting the need for well-targeted programs). By contrast, adult literacy (for both education and health indicators) and vaccination (for infant and child mortality) have positive impacts.

    - **Lack of efficiency.** There are some issues with regards to the efficiency with which southern states use their available resources. Efficiency appears to be a serious problem in Guerrero for the infant and child mortality indicators and in Chiapas for net primary school enrollment. Furthermore, because the benchmark for comparison of efficiency of the southern states is efficiency of other Mexican states, and there is probably room for efficiency gains throughout Mexico that are not captured in our analysis, the results suggest that some focus should be placed on improving efficiency in the use of inputs.

- **Are existing targeted programs appropriate for reaching the MDGs?** Better assets will be needed in the south to catch up with the rest of the country. To build these assets, federal funding will be required, but efforts must also be made to ensure that local authorities at the municipal and state level have the capacity to absorb extra resources in a context of decentralized decision-making. This is the first message we wish to convey, which follows up on the efficiency issue already mentioned. The second message is that because broad increases in public spending for education and health may have only a limited impact on outcomes, it will remain necessary to rely on integrated and well-targeted programs, such as PROGRESA, which generate human capital investments that are beneficial in the long run.

II. Development Targets: The Millennium Development Goals

The MDGs provide a simple framework for discussing development targets in Mexico and the southern states (see Box 1; for more information, see http://www.developmentgoals.org/). The main targets, together with a brief description of the position of Latin America, Mexico, and the southern states for the related indicators, are provided in Table 1. There is ample evidence that the southern states are lagging behind the rest of the country, so specific policies will need to be implemented to enable these states to catch up with the country as a whole. In this section, we briefly review the progress to date for various MDGs, and for some indicators, such as poverty, we assess whether the south and Mexico as a whole are likely to reach the targets.

Table 1. Mexico's Southern States and Selected Millennium Development Goals: An Overview

MDGs: Selected Targets	*Latin America and the Caribbean (LAC)*	*Mexico*	*Chiapas, Guerrero, and Oaxaca*
Reduce the share of the population in extreme poverty by half between 1990 and 2015.	Regional World Bank estimates suggest a reduction in the share of the population in extreme poverty from 20% in 1992 to 17% in 1998. Global World Bank estimates based on US$1/day poverty lines suggest a reduction from 16.8% in 1990 to 12.1% in 1999.	The population's share in extreme poverty decreased from 23% in 1992 to 17% in 2000 (these are the income-based estimates presented in the Poverty Note in this report).	The population's share in extreme poverty decreased from 54% in 1992 to 46% in 2000 (income-based estimates in the Poverty Note). Of the three growth scenarios suggested in the Macroeconomics Note in this report, only the high growth scenario would enable the southern states to reduce extreme poverty in half by 2015.
Achieve universal primary education.	According to World Bank estimates, net primary school enrollment rates have increased from 89% in 1990 to 97% in 1999.	The enrollment rates in 2000 for 6- to 14-year-olds was 92.8% according to Census data.	The enrollment rates in 2000 for 5- to 9-year-olds were 79.7% in Chiapas, 83.9% in Guerrero, and 85.7% in Oaxaca. For 10- to 14-year-olds, the rates in the three states were 81.9%, 87.7%, and 87.8%.
Promote gender equity and empower women, in part through education parity.	According to World Bank estimates, the ratio of girls to boys in primary and secondary school has increased from .977 in 1990 to .987 in 1999.	For ages 5 to 9, there is parity in enrollment by gender. For ages 10 to 14, the gap is 0.6 percentage points in the 2000 Census.	For ages 5 to 9, there are few differences in enrollment by gender. But for ages 10 to 14, the gender gaps (in percentage points) are 5.4 in Chiapas, 1.5 in Guerrero, and 3.2 in Oaxaca in the 2000 Census.
Reduce the under-five mortality rate by two thirds between 1990 and 2015.	According to World Bank estimates, infant mortality decreased in LAC from 41 per 1,000 in 1990 to 29 per 1000 in 2000.	According to CONAPO, the infant mortality rate in Mexico decreased from 36.6 per 1,000 in 1990 to 24.9 in 1997.	According to CONAPO, the infant mortality rate in 1997 was 31.9 per 1,000 in Chiapas, 29.7 in Guerrero, and 31.7 in Oaxaca.
Reduce the maternal mortality rate by three fourths between 1990 and 2015.	There are no regional estimates for maternal mortality in the World Bank's web site on the MDGs.	According to CONAPO, the maternal mortality rate decreased from 5.4 per 10,000 pregnancies in 1990 to 4.7 in 1997.	According to CONAPO, the maternal mortality rates in Chiapas, Guerrero, and Oaxaca were 6.3, 5.3, and 7.5 per 10,000, respectively, in 1997.
Reduce by half the population without access to an improved water source (there are also other environment-related targets).	According to World Bank estimates, access to an improved water source increased in LAC from 81% in 1990 to 85% in 2000. Access to improved sanitation increased from 72% in 1990 to 78% in 2000.	In the 2000 Census, access to pipe water was 84% nationally, while access to sanitation was 78%. As noted in the Poverty Note, these access rates improved substantially in the 1990s.	In the 2000 Census, access rates to pipe water in Chiapas, Guerrero, and Oaxaca were 68.0%, 59.9%, and 65.5 %, while access rates to sanitation were 62.3%, 53.6%, and 45.6%. As noted in the Poverty Note, these access rates improved substantially in the 1990s.

National Population Council (*Consejo Nacional de Población*—CONAPO).

Source: For LAC, estimates are from http://www.developmentgoals.org/Data.htm, except the regional poverty estimates, which are from Wodon and others 2001. For Mexico, the sources are the National Institute of Statistics, Geography, and Information (*Instituto Nacional de Estadística, Geografia e Informática*—INEGI) for education indicators, CONAPO for health indicators, and the estimation provided by the authors of the Poverty Note for poverty.

Box 1. The Millennium Development Goals: A Brief Description

The MDGs were approved through the Millennium Declaration at the U.N. in September 2000. The first seven MDGs can be conveniently grouped into three categories (the eighth MDG relates to the development of a global partnership for development, which is beyond the scope of this Note): (a) eradicating extreme poverty and hunger; (b) achieving universal primary education and promoting gender equality; and (c) improving health outcomes and ensuring environmental sustainability.

Eradicating extreme poverty and hunger (Goal 1). The first MDG is the eradication of extreme poverty and hunger. To monitor progress, there are two targets. The first is to reduce extreme poverty by half between 1990 and 2015. Although progress toward that goal is measured at the international level with poverty measures based on a purchasing power parity adjusted poverty line of US$1 dollar per day, in Mexico, progress can be assessed using country-specific poverty lines, as was done in this Note. The second target is to reduce by half the share of the population that suffers from hunger. The indicators for this target are the prevalence of malnutrition, as well as estimates of the share of the population without adequate dietary energy consumption.

Achieving universal primary education and promoting gender equality (Goals 2 and 3). The next two MDGs are to achieve universal primary education and promote gender equality. The target for universal primary education is the completion of a full course of primary schooling by boys and girls alike. There are three indicators to measure progress: the net enrollment ratio in primary education, the proportion of pupils starting grade 1 who reach grade 5, and the illiteracy rate of 15- to 24-year-olds. The target for gender equality and the empowerment of women is the elimination of gender disparities in primary and secondary education by 2005, and for all levels of education by 2015. The four indicators suggested for monitoring progress over time are the ratio of girls to boys in primary, secondary, and tertiary education, the ratio of literate females to males of 15- to 24-year-olds, the ratio of women to men in wage employment in the nonagricultural sector, and the proportion of seats held by women in national parliament.

Improving health outcomes and ensuring environmental sustainability (Goals 4 to 7). The fourth and fifth MDGs are essentially to reduce child and maternal mortality. The targets for child mortality are to reduce by two thirds, between 1990 and 2015, the under-five mortality rate (with three indicators: the under-five mortality rate, the infant mortality rate, and the proportion of 1-year-old children immunized against measles). The targets for maternal mortality are to reduce by three quarters, between 1990 and 2015, the maternal mortality ratio (with two indicators: the maternal mortality ratio itself and the proportion of births attended by skilled health personnel). The sixth MDG is also related to health: it consists of combating and reversing the spread of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), malaria, and other communicable diseases. The seventh MDG is to ensure environmental sustainability. While there are many indicators here, an important one consists of halving by 2015 the proportion of people without sustainable access to safe drinking water.

Poverty

As discussed in more detail in the Poverty Note, thanks to solid growth in the second half of the 1990s, Mexico as a whole has been able to offset the negative impact of the 1994–95 crisis on standards of living. This has also been observed in the south. As shown in Table 2, the share of the population with per capita income below what is needed to meet basic food needs (that is, the share of the population in extreme poverty) increased between 1992 and 1996 from 54 percent to 60 percent. This increase has been more than compensated by 2000, with a level of extreme poverty of 46 percent in 2000 according to estimates based on the National Household Survey (*Encuesta Nacional de Ingresos y Gastos de los Hogares*—ENIGH).

Table 2. Share of the Population in Poverty and in Extreme Poverty, 1992–2000

	National			*Urban*			*Rural*		
	Mexico	*South*	*Difference*	*Mexico*	*South*	*Difference*	*Mexico*	*South*	*Difference*
	Share of Population in Extreme Poverty According to per Capita Income, %								
1992	23	54	31	16	37	21	44	72	28
1996	31	60	29	19	36	17	61	81	20
2000	17	46	29	8	21	13	46	70	24
	Share of Population in Poverty According to per Capita Income, %								
1992	54	82	28	47	77	30	74	88	14
1996	61	83	22	52	70	18	85	94	9
2000	42	67	25	32	48	16	72	86	14

Source: Poverty Note in this report; estimates based on 1992, 1996, and 2000 ENIGH surveys.

Education and Gender Equity

Enabling children to complete their primary education is clearly necessary for any development strategy in the south, because it will help the children to emerge from poverty when they reach adulthood. According to estimates provided in the Poverty Note, when the head of household has completed the primary education cycle, the individuals in the household have a level of per capita income on average 20 percent higher than if the head of household had no education at all. If the spouse also completes the primary education cycle, this generates an additional 14 percent gain in per capita income in the household. Having both the head of household and the spouse completing the primary education cycle thus increases the household's income by one third. Of course, investments in education will take time to bear fruit and reduce poverty (the children must become adults and make a living). Still, education remains one of the best investments that can be made to provide long-term opportunities for the population of the southern states.

As in Mexico as a whole, the southern states have made substantial progress toward educating their populations. In Chiapas, the share of the population older than 15 years of age with no education at all or with incomplete primary education has decreased by 10 percentage points in the past 10 years, from 64 percent in 1990 to 54 percent in the 2000 Census (Table 3). In Guerrero, the corresponding share has decreased by almost 8 percentage points, from 52 percent to 44 percent. In Oaxaca, the share has decreased by 10 percentage points, from 59 percent to 49 percent.

Table 3. Adult Population in the Southern States by Education Level, 1990 and 2000 Census

	1990			*2000*		
	Total	*Men*	*Women*	*Total*	*Men*	*Women*
Chiapas						
No education (%)	29	22.8	35.1	22.9	17.7	27.9
Incomplete primary (%)	31	33.4	28.6	27	27.7	26.3
Complete primary (%)	13.8	15.2	12.6	17.3	18.1	16.6
Above primary (%)	22.8	25.9	19.8	31.9	35.7	28.3
Not specified (%)	3.4	2.8	3.9	0.9	0.8	0.9
Guerrero						
No education (%)	26.8	23.1	30.2	21.4	18.2	24.3
Incomplete primary (%)	21.9	22.6	21.3	20.1	20.3	19.8
Complete primary (%)	15.9	16.3	15.6	17.2	17.2	17.1
Above primary (%)	32.1	35.2	29.4	40.3	43.3	37.7
Not specified (%)	3.2	2.8	3.5	1	0.9	1
Oaxaca						
No education (%)	26	19.5	31.9	20.3	15.2	24.7
Incomplete primary (%)	29.3	31.6	27.2	24.8	25.9	23.9
Complete primary (%)	18.7	20.4	17.2	20.7	21.3	20.1
Above primary (%)	23.5	26.6	20.7	33.3	36.7	30.2
Not specified (%)	2.5	2	2.9	1	0.9	1.1

Source: INEGI.

However, despite progress, the southern states are still lagging behind not only in terms of education levels among the adult population, but also in terms of school enrollment rates for children. As shown in Table 4, while the net enrollment rate in 2000 for 6- to 14-year-olds was 92.8 percent at the national level in the 2000 Census data estimates provided by INEGI, the rates for 5- to 9-year-olds were 79.7 percent in Chiapas, 83.9 percent in Guerrero, and 85.7 percent in Oaxaca, and for 10- to 14-year-olds, the rates were 81.9 percent, 87.7 percent, and 87.8 percent. In other words, in the three southern states, enrollment rates remain 5 to 10 percentage points below the national average. Furthermore, while at the national level the gender gap in enrollment for ages 10 to 14 is almost nonexistent, the gaps are larger in the three southern states (5.4 percentage points in Chiapas, 1.5 percentage points in Guerrero, and 3.2 percentage points in Oaxaca).

Table 4. Enrollment Rates by Gender and Age Group in the Southern States, 2000 Census

	Share Enrolled (%)			*Share Not Enrolled (%)*			*Status Not Specified (%)*		
	Total	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*
Chiapas									
Age 5–9 years	79.7	79.9	79.5	18.8	18.5	19.1	1.5	1.5	1.5
Age 10–14 years	81.9	84.6	79.2	17.7	15.1	20.4	0.4	0.4	0.4
Age 15–19 years	37.8	42.6	33.2	61.7	56.9	66.2	0.5	0.5	0.5
Guerrero									
Age 5–9 years	83.9	83.7	84.2	14.6	14.7	14.4	1.5	1.5	1.5
Age 10–14 years	87.7	88.4	86.9	12.1	11.3	12.8	0.2	0.3	0.2
Age 15–19 years	45.9	47.6	44.2	53.9	52.2	55.5	0.3	0.3	0.3
Oaxaca									
Age 5–9 years	85.7	85.6	85.8	12.9	13	12.9	1.4	1.4	1.4
Age 10–14 years	87.8	89.4	86.2	11.9	10.3	13.5	0.3	0.3	0.3
Age 15–19 years	43	46.3	39.8	56.6	53.3	59.8	0.4	0.4	0.4

Source: INEGI.

Health and Access to Basic Infrastructure

In the MDG framework, the key targets for health are to reduce infant and child mortality rates by two thirds, and the maternal mortality rate by three quarters, between 1990 and 2015. An additional target is to provide access to all women to reproductive health services by 2015. Basic health statistics at the national level and in the southern states are provided in Table 5. Here again, the performance of the south is well below that of the country as a whole. The three southern states have the highest rates of fertility among the 32 states. As a result, the dependency ratios, which can be used to measure the burden on wage earners in a household to provide for other household members, are highest in the south. The three southern states have the lowest rates of life expectancy and relatively high rates of infant and child mortality. This may be in part because the share of the population with health insurance is also much lower in the south than in other states. It may also be in part because the three southern states have much lower access rates to a range of basic infrastructure services, including pipe water, sanitation, and electricity. While almost three fourths of the population has access to all three services at the national level, the proportion is well below half in each of the three southern states, and as low as one third (37.8 percent) in the state of Oaxaca.

Table 5. Health Statistics and Access to Basic Services in the Southern States, 2000 Census

	National	*Chiapas*		*Guerrero*		*Oaxaca*	
	Rate	*Rate*	*Ranking*	*Rate*	*Ranking*	*Rate*	*Ranking*
Fertility rate	2.9	3.5	2	3.7	1	3.3	3
Life expectancy	75.4	72.4	32	73.3	30	72.5	31
Population with health insurance	40.1	17.6	32	20.3	31	22.6	30
Dependency ratio	64	76.2	3	80.6	1	78.3	2
Infant mortality rate							
Maternal mortality rate	5.3	6.6	4	9.7	1	6.4	6
Access to basic services							
Pipe water	84.3	68	29	59.9	32	65.5	31
Sanitation	78.1	62.3	28	53.6	31	45.6	32
Electric energy	95	87.9	31	89.3	29	87.3	32
All three services	71.8	48.1	30	41.8	31	37.8	32

Source: INEGI.

III. Assessing the Likelihood of Reaching the MDGs in Mexico

How likely is it that Mexico and the southern states will reach the MDG targets? For extreme poverty and poverty, the 2000 ENIGH survey can be used to answer this question under different growth scenarios, assuming that there is no change in inequality over time. The method consists of raising the per capita income of all households by the same real per capita GDP growth rate in the survey, and estimating again the poverty measures. For this exercise, we use the three growth scenarios proposed in the Macroeconomics Note. The low growth scenario for the southern states assumes for the period 2001–06 a growth rate of 2.2 percent, which together with a population growth rate of 1.2 percent, yields a growth rate in per capita income of 1 percent per year. The base growth scenario assumes a growth rate of 3.0 percent, which yields a rate of growth in per capita income of 1.8 percent. The high growth scenario assumes a growth rate of 4.5 percent, which yields a rate of growth in per capita income of 3.3 percent per year. For comparability, we use the same growth rates for Mexico as a whole. (The Macroeconomics Note proposes for the country as a whole a growth rate of 2.7 percent in the base case and 4.3 percent in the high case.) Also, rather than predicting poverty with these growth rates until 2006, we go all the way to 2015, which is the date for reaching the targets in the MDGs.

Simulation results for income poverty measures are given in Table 6 (the results for the measures using per capita consumption are similar and are not presented here). The table provides the share of the population that can be expected to be poor or extremely poor in 2005, 2010, and 2015. The estimates for 1992 and 2000 are those presented in the Poverty Note. Under the low growth scenario, poverty and extreme poverty will not be reduced by half in 2015 in either the country as a whole or the southern states. Under the base case scenario, extreme poverty will be reduced by half in 2015 in the country as a whole, but not in the southern states, and poverty will not be reduced by half in either. Under the high growth scenario, extreme poverty will be reduced by half in 2015 in both the country as a whole and in the southern states, but while poverty will also be reduced by half in the country as a whole, this will not be the case in the southern states, essentially because the starting level of poverty is so high.

Table 6. Share of the Population in Poverty and Extreme Poverty under Growth Scenarios

	Per Capita Income Growth of 1%		*Per Capita Income Growth of 1.8%*		*Per Capita Income Growth of 3.3%*	
	Mexico	*South*	*Mexico*	*South*	*Mexico*	*South*
	Share of Population in Extreme Poverty According to per Capita Income					
1992	23	54	23	54	23	54
2000	17	46	17	46	17	46
2005 (estimated)	16	43	15	42	13	39
2010 (estimated)	15	41	13	38	10	31
2015 (estimated)	13	40	11	33	7	26
Extreme poverty reduced by half	No	No	Yes	No	Yes	Yes
	Share of Population in Poverty According to per Capita Income					
1992	54	82	54	82	54	82
2000	42	67	42	67	42	67
2005 (estimated)	40	65	38	63	35	61
2010 (estimated)	38	63	34	60	28	54
2015 (estimated)	36	61	30	57	22	51
Poverty reduced by half	No	No	No	No	Yes	No

Source: Authors, using 2000 ENIGH.

What about other MDG targets? Answering this question is more difficult because of the many factors that may affect education, health, and infrastructure outcomes. Still, tentative answers can be given (see Box 2 on the methodology). In Mexico, despite progress in reducing extreme poverty in the 1990s, Hicks and Wodon (2002) suggest that it is possible, but not guaranteed, that the share of the population living in extreme poverty will be cut by half between 1990 and 2015. The same is true for the population in poverty. Progress toward a reduction in malnutrition in line with the MDG target is more likely. Reaching quasi-universal net primary enrollment is also likely. By contrast, reaching the targets for infant and under-five mortality is unlikely, not so much because no progress has been achieved since 1990 or is to be expected by 2015, but rather because the targets are quite ambitious. The same findings are likely to apply to the southern states, where, as already mentioned for poverty, reaching the targets may be even more difficult. Reaching universal primary education completion will also be tougher in the south, since the current levels of enrollment and completion are lower there than nationally.

Box 2. Techniques for Assessing the Realism of Development Targets

As noted in Christiaensen, Scott, and Wodon (2002), three techniques can be used to assess the realism of targets: historical benchmarking, macrosimulations, and microsimulations. Historical benchmarking uses basic information from the past to suggest targets for the future. By contrast, under the simulation approaches (whether macro or micro), by establishing an empirical relation between the targets and their correlates, the feasibility of the targets is evaluated according to the feasibility of the required growth path of their correlates.

Hicks and Wodon (2002) have summarized results obtained for many Latin American countries from the application of "SimSIP Goals," a simple macro-based, Excel-based simulation tool available free of charge at www.worldbank.org. To predict future values for social indicators, the SimSIP simulator takes into account projections for future GDP growth, population growth, and urbanization, and elasticities of poverty and social indicators to these variables. The elasticities for each social indicator are based on regressions from worldwide panel data. Time trends are also estimated from country-level data. The hypotheses for urbanization and population growth follow baseline scenarios from the U.N. The hypothesis for real GDP growth is an average rate of growth per year for 2000–15, which has been set at 4.5 percent for Mexico. Apart from assessing whether countries will reach targets for malnutrition, education, and health indicators, the authors also provide estimates of whether countries will reach poverty targets using elasticities of poverty to growth (this is a different approach than the one adopted for estimating future poverty levels in Table 6).

The authors find that Mexico may reduce its share of the population in extreme poverty by half between 1990 and 2015, but this is not certain. A reduction by half in malnutrition is more likely to be achieved, as is the target of near universal primary school completion. However, the targets for infant and under-five mortality are quite ambitious, so it remains unclear as to whether they will be achieved, despite substantial progress in the 1990s. Mexico is not the only country in Latin America that may have difficulties in reaching the MDGs—for most other Latin America countries as well, many of the MDGs will be difficult to reach. The findings are summarized in Note No. 8 in the *En Breve* series, at http://www.worldbank.org/en_breve.

IV. Measuring the South's Efficiency in Improving Health Indicators

The previous sections have suggested that the southern states are still lagging far behind other states in a number of areas. In this section, we tackle the question of how the southern states could improve their education and health indicators. This is done at a fairly general level (see Box 3 for a brief description of the methodology), since detailed policy options are discussed in the Education and Health Notes. Still, our findings may provide some broad ideas of what could be achieved in the best of worlds. For this, we will first consider health. The level of public spending per capita on health is potentially a key determinant of health outcomes. However, higher levels of social spending alone may not be sufficient to improve health indicators if they are not accompanied by higher levels of efficiency in public spending. In other words, given the relative scarcity of resources in Mexico as a whole and in the southern states especially, increasing spending to improve health indicators may not be the sole or even the most desirable alternative. Better outcomes might also be reached through a more efficient use of existing resources. This section and the next focus on these issues.

To measure the efficiency of each Mexican state in improving health indicators, we follow the method presented in Jayasuriya and Wodon (2002). Infant and child mortality are the two health indicators considered. State-level data for the period 1990–96 are used for the empirical analysis (the data are from the National Program of Action in Support of Childhood [*Programa Nacional de Accion en Favor de la Infancia*]). We use seven inputs in the health production functions: per capita GDP, per capita expenditure on health, the adult literacy rate, the vaccination rate, the rate of access to public hospitals, the rate of access to potable water, and time to capture potential technological progress.

Basic statistics (Mexico's state average, southern state average, and values for Chiapas, Guerrero, and Oaxaca) for the health outcomes and input measures are provided in Table 7. For the production frontier formulation to have larger numbers depicting better outcomes, noninfant mortality rate (per 100) and nonchild mortality rates (per 100) are used as health outcome measures. These nonmortality rates are defined as 100 minus the corresponding mortality rates. The mean values of the health outcome measures and inputs used to reach these outcomes indicate that the southern states fare worse than the Mexican state average values. The noninfant mortality rate for the average Mexican state is approximately 1 percent better than the corresponding southern state outcomes (97.35 per 100 in Mexico versus 96.51, 95.47, and 96.60 per 100 in the southern states of Chiapas, Guerrero, and Oaxaca). The nonchild mortality rate indicates an even larger disparity. The Mexico state average is 1.5 percent better than the corresponding southern state outcomes (96.77 per 100 in Mexico versus 94.95, 94.81, and 95.10 in the southern states).

Not surprisingly, the input measures for the average Mexican state are also better than those observed in the southern states. The state average GDP per capita is approximately twice as large in the country as a whole than in the southern states (11,622 pesos in Mexico versus 5,346, 7,148, and 5,440 pesos in the southern states). The same is observed for per capita health expenditure (327 pesos in Mexico versus 168, 185, and 168 pesos in the southern states). The average Mexican state adult literacy rate is approximately 13 percent higher than in the southern states (88.7 percent in Mexico versus 72.8, 75.2, and 75.4 percent in the southern states). The vaccination data indicate that the Mexican average is much better than in Chiapas (90.8 percent in Mexico versus 76.7 percent in Chiapas), but only slightly better or on par with Guerrero and Oaxaca (90.8 percent in Mexico versus 90.8 and 89.0 percent in Guerrero and Oaxaca, respectively). The Mexico state average for access to public hospitals and access to potable water is roughly 20 points better than in the southern states (access to public hospitals: 77.4 percent in Mexico versus 56.2, 55.8, and 59.3 percent in the southern states; access to potable water: 86.5 percent in Mexico versus 66.0, 65.0, and 66.0 percent in the southern states).

Table 7. Health Outcomes and Input Use Measures for Infant and Child Mortality

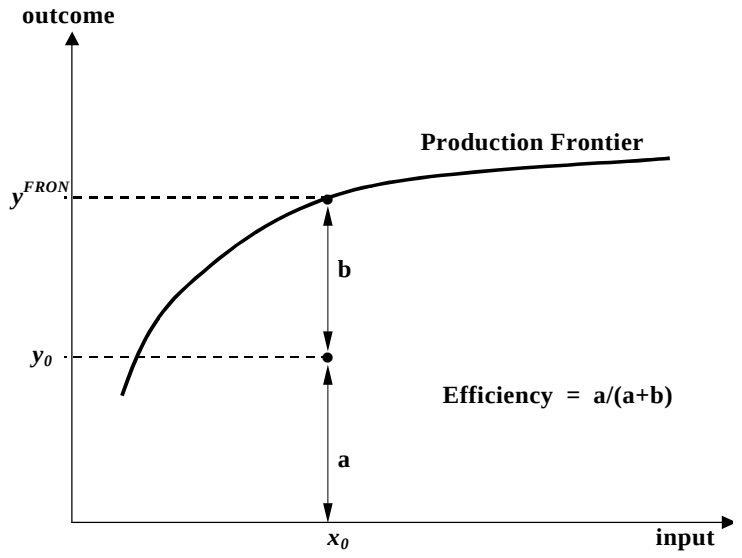
	State	*Southern*	*Chiapas*	*Guerrero*	*Oaxaca*
Noninfant mortality, per 100[a]	97.35	96.19	96.51	95.47	96.60
Nonchild mortality, per 100a	96.77	94.95	94.95	94.81	95.10
GDP, per capita (constant 1999 pesos)	11,622	5,978	5,346	7,148	5,440
Expenditure, per capita (constant 1999 pesos)	326.85	173.98	168.49	185.10	168.35
Adult literacy (% of population)	88.69	74.48	72.79	75.23	75.41
Vaccination (% of population)	90.81	85.49	76.70	90.80	88.96
Access to public hospitals (No. of births)	77.42	57.10	56.20	55.80	59.30
Access to potable water (% of population)	86.53	65.67	66.00	65.00	66.00

a. Nonmortality rates are used in the estimation.
Source: INEGI; General Office for Information and Performance Evaluation (DGIED); National Institute for Adult Education (INEA); National Immunization Council (Mexico); National Water Commision (Mexico).

Box 3. Measuring State Efficiency in Improving Education and Health Indicators

The efficiency of input use to produce an outcome can be studied using the production frontier framework. Consider the one-input one-output example in the figure below. The objective or outcome is depicted along the vertical axis while input use is depicted on the horizontal axis. The curved line represents the maximum possible level of the outcome that can be obtained for a given level of input use. Assume that a country produces "a" units of outcome (say, a net primary enrollment of 80 percent) from x_0 units of inputs (say, a level of public spending of 100), and that under perfect efficiency it could have produced "a+b" units of the outcome (say, a level of enrollment of 90 percent). The efficiency (E) can then be defined as the ratio of attained or observed outcome to the best practice outcome for a given level of input use: "a/(a+b)" (which in our example would be an efficiency of 89 percent, that is, 80/90). While the outcome could be improved through an expansion of input use, keeping efficiency constant, it could also be improved through an increase in efficiency, keeping input use constant, or a combination of both. The estimation of the production frontier in this Note is based on a program provided by Coelli (1996). For a different estimation method but with similar aim and a focus on health, see Evans and others (2000).

Measuring Efficiency of Input Use To Improve Outcomes



Source: Authors.

Three separate models (to test for the robustness of the results) have been used to estimate the relationships between the inputs and the best possible health outcomes that can be achieved by the various states. The differences between the three models lie in the inclusion of the per capita GDP and per capita health expenditure variables. Model I has both variables, while models II and III have only one of the two variables included in the specification. The production frontier coefficients in Table 8 provide the results of the estimations. They suggest the following:

- Per capita GDP has a positive and statistically significant impact on infant and child mortality. An increase in per capita income of 1,000 pesos reduces infant and child mortality by 0.3 and 0.4 per 1,000 births, respectively. Given that the average state infant and child mortality rates are 26.5 and 32.3 per 1,000, these impacts are small (1.1 percent of infant mortality and 1.2 percent of child mortality).

- A 1 percent improvement in the adult literacy rate has a positive and statistically significant impact on infant mortality (reduction by 0.7 to 0.8 per 1,000 births) and child mortality (reduction by 1.0 to 1.2 per 1,000 births). Given the average state infant and child mortality rates mentioned above, these impacts are larger than those observed for GDP (reduction by 2.8 percent of infant mortality and 3.4 percent of child mortality).

- The vaccination rate also has a positive and statistically significant impact on infant and child mortality. A 1 percent increase in the vaccination rate reduces the infant mortality rate by 0.1 per 1,000 births, while the child mortality rate declines by 0.2 per 1,000 births. This represents a 0.4 percent reduction in infant mortality and a 0.6 percent reduction in child mortality. (Note that it was to be expected that the impact of vaccination would be larger on child than infant mortality.)

- Time also has a positive and statistically significant impact on health outcomes, with each additional year reducing infant mortality by 0.5 to 0.9 per 1,000 births, and child mortality by 0.5 to 1.1 per 1,000 births. This represents approximately 2.6 percent of the existing infant mortality rate and 2.5 percent of the child mortality rate. The impact of time is probably the result of progress in medicines and care.

- By contrast, the impact of per capita health expenditure is not statistically significant albeit being positive in all three specifications of the model. Similarly, the other two variables, namely access to public hospitals and access to potable water, do not appear to have positive and statistically significant impacts on infant and child mortality in this estimation (in other models in the literature, positive relationships have been found).

Table 8. Production Frontier Coefficients for Infant and Child Mortality, 1990–96

	Infant Mortality[a]			*Child Mortality*[a]		
	Model I	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*
Constant	90.71	90.06	90.49	85.59	84.86	85.48
GDP per capita (1993 pesos)	0.00003	—	0.00003	0.00004	—	0.00004
Expenditure, per capita	NS	NS	—	NS	NS	—
Adult literacy (% of population)	0.06894	0.07893	0.07090	0.10379	0.11964	0.10480
Vaccinations (% complete)	0.00844	0.01038	0.00759	0.01920	0.02181	0.01819
Access to public hospital (% population)	NS	NS	NS	NS	NS	NS
Access to water (% population)	NS	NS	NS	NS	NS	NS
Year	0.07367	0.05237	0.09479	0.09057	0.05423	0.11330
Number of observations	224	224	224	224	224	224

— Not applicable
NS, not statistically significant.
a. Nonmortality rates are used in the estimation. Other coefficients are statistically significant at the 5 percent level or better.
Source: Authors.

Beyond the estimates of the impact of various potential inputs on outcomes, the estimation method provides estimates of the efficiency of various states in reaching the best possible outcomes. We have three different estimates of efficiency, one each for the different specifications of the production frontier. Graphs with the state-level efficiency measures for model I are provided in Annex 1 for easier comparisons and rankings. As shown in Table 9, the efficiency in reaching the best possible health outcomes for infant and child mortality in Chiapas and Oaxaca is on par (or sometimes better) with the Mexican state averages. The Guerrero efficiency measures, however, are below the Mexican average for all models, which suggests that some focus needs to be placed on the issue in that state.

Table 9. State-Level Efficiency Measures for Health Outcomes, 1990–96

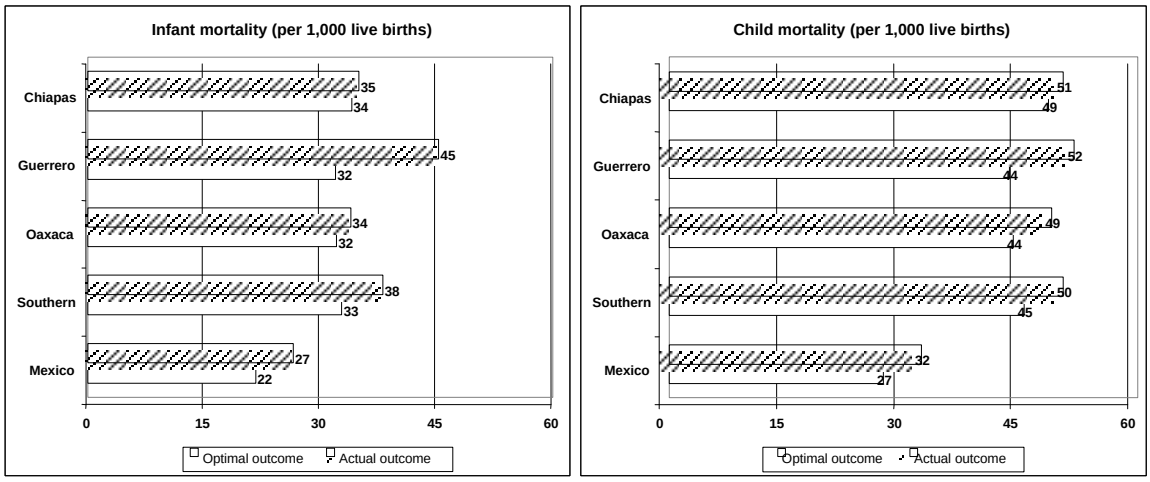
	Mexico Average	*State-Level Averages*			
		Southern	*Chiapas*	*Guerrero*	*Oaxaca*
Infant mortality, model I[a]	99.48	99.44	99.91	98.62	99.80
Infant mortality, model II[a]	99.46	99.42	99.91	98.60	99.74
Infant mortality, model III[a]	99.48	99.45	99.91	98.63	99.80
Child mortality, model I[a]	99.49	99.47	99.80	99.13	99.49
Child mortality, model II[a]	99.43	99.41	99.79	99.07	99.37
Child mortality, model III[a]	99.45	99.44	99.76	99.11	99.45

a. Nonmortality rates are used in the estimation.
Source: Authors.

Importantly, the fact that the efficiency measures in Table 9 appear to be quite high does not mean that no progress could be achieved with better efficiency. Indeed, the measures must be interpreted with care given the way the indicators have been defined. For example, in the preferred specification of model I, an infant mortality efficiency measure of 98.62 for Guerrero (99.80 for Oaxaca; 99.91 for Chiapas) means that under perfect efficiency and at the current level of input use, infant mortality could be improved by 13.3 per 1,000 births (for Oaxaca: 1.9 per

1,000 births; for Chiapas: 0.9 per 1,000 births). Similarly for the child mortality rates, an efficiency measure of 99.13 for Guerrero (99.49 for Oaxaca; 99.80 for Chiapas) means that under perfect efficiency and at the current level of input use, child mortality could be improved by 8.3 per 1,000 births (for Oaxaca: 4.9 per 1,000 births; for Chiapas: 2.0 per 1,000 births). The infant mortality and child mortality data presented below in Figure 1 provide actual and optimal outcome measures for Chiapas, Guerrero, Oaxaca, and the averages for Mexico and the southern states.

Figure 1. Actual and Optimal Outcomes for Infant and Child Mortality



Source: Authors.

The conclusion of this analysis regarding the scope for efficiency gains in reaching better outcomes in infant and child mortality is that in Guerrero, apart from low levels of "inputs," inefficiencies in using existing inputs explain part of the lags. In Chiapas and Oaxaca, the situation is better. Yet this does not mean that there is no scope for efficiency gains in these two states, since the benchmark for comparison of the efficiency of southern states is other states, and there may be scope for efficiency gains throughout Mexico that are not captured in our analysis. As is mentioned briefly in the last section of this Note, since broad increases in public spending are not likely to have a large impact on the outcomes considered here, targeted programs such as PROGRESA may be a large part of the answer to improve inputs, efficiency, and outcomes at once.[2]

V. Measuring the South's Efficiency in Improving Education Indicators

A similar analysis has been conducted for education outcomes. We consider three outcomes here: net primary enrollment, net secondary enrollment, and test scores (for grades 1 to 6). We use data for two years: 1994 and 2000. The net enrollment rates are used as proxies for education flow or "quantity" variables, while test scores are used as education "quality"

[2] The evaluation of PROGRESA, prepared by the International Food Policy Research Institute (IFPRI), does suggest important gains in health indicators.

measures. Table 10 presents mean values for the education outcomes and the related inputs. The net primary and secondary enrollment average in the southern states fares worse than the Mexican average, but the education quality measure is on par (Table 10). The net primary enrollment rate for the Mexico state average is 8 percent better than the southern state average outcome (93.2 percent in Mexico versus 77.9, 86.9, and 88.2 percent in the three southern states of Chiapas, Guerrero, and Oaxaca). The net secondary enrollment rate differences are larger, with the Mexico state average being 13 percent higher than the southern state average (60.4 percent in Mexico versus 39.4, 50.5, and 51.2 percent in the southern states). The test scores in the southern states, however, are on par with the Mexico state average.

The input levels used to reach outcomes in the south are below the Mexican state average, as is well known. The comparison of the state average GDP per capita and the adult literacy rate were already done in the case of the health analysis (we use these two variables as inputs for both sectors). Per capita net primary education expenditure is higher in the average Mexican state than in the south (565 constant pesos in Mexico versus 351, 554, and 552 constant pesos in the southern states), and the same is true for net secondary education expenditure per capita (236 constant pesos in Mexico versus 128, 192, and 184 constant pesos in the southern states).

Table 10. State-Level Enrollment Rates, Test Scores, and Input Measures, 1994 and 2000

	State	*Southern*	*Chiapas*	*Guerrero*	*Oaxaca*
Net primary enrollment (% of students)	93.21	84.32	77.85	86.95	88.15
Net secondary enrollment (% of students)	60.43	46.98	39.35	50.45	51.15
Test scores (grades 1 to 6)	44.81	44.65	45.33	43.92	44.71
GDP, per capita (constant 1993 pesos)	13,579	6,617	6,086	7,649	6,116
Expenditure primary, per capita	564.75	485.77	351.24	554.23	551.84
Expenditure secondary, per capita	235.74	168.19	127.84	192.35	184.37
Adult literacy (% of population)	89.90	76.87	75.60	77.35	77.65

Source: Secretariat of Education (*Secretaria de Educacion*- SEP); INEGI; INEA.

Similar to the health outcome analysis, three separate models are used to estimate the relationships between the inputs and the best possible education outcomes that can be achieved by the states, with the differences between the models consisting of the inclusion of per capita GDP, per capita education expenditure, or both. The estimation results suggest the following:

- Per capita GDP and per capita expenditure on primary or secondary education do not have a statistically significant impact on net primary enrollment, net secondary enrollment, and test scores.

- Adult literacy has a positive and statistically significant impact on all three outcomes: primary enrollment, secondary enrollment, and test scores. A 1 percent increase in adult literacy leads to a 0.65 percent improvement in net primary enrollment, a 1.0 percent improvement in net secondary enrollment, and a 0.05 improvement in test scores.

- The time variable also has a statistically significant and positive impact on primary enrollment, secondary enrollment, and test scores. One year leads to a 0.6 percent

increase in both the net primary and net secondary enrollment rates and a 0.2 increase in the test scores (the estimates in Table 11 for time capture the impact of several years).

- For test scores, the grade variable is positive and statistically significant, which indicates that as a student advances a grade the test score increases (by 0.87 points).

Table 11. Production Frontier Coefficients for Enrollment Rates and Test Scores

	Net Primary Enrollment			*Net Secondary Enrollment*		
	Model I	*Model II*	*Model III*	*Model I*	*Model II*	*Model III*
Constant	33.64	35.35	33.64	NS	- 38.59	NS
GDP, per capita	NS	—	NS	NS	—	NS
Expenditure, per capita	NS	NS	—	NS	NS	—
Adult literacy (% of population)	0.6546	0.6145	0.6452	1.0394	1.2073	1.0287
Year	4.0167	4.1772	4.4125	4.3167	4.3619	4.1144
Number of observations	64	64	64	64	64	64
				Test Scores (Grades 1 to 6)		
				Model I	*Model II*	*Model III*
Constant				39.07	38.29	38.42
GDP, per capita (constant 1993 pesos)				NS	—	NS
Expenditure, per capita				NS	NS	—
Adult literacy (% of population)				0.0405	0.0503	0.0456
Grade				0.8739	0.8743	0.8713
Year				0.6105	0.6089	0.6192
Number of observations				318	318	318

— Not applicable
NS, not statistically significant. Other coefficients significant at the 5 percent level or better.
Source: Authors.

As was the case for health, beyond the estimates of the impact of various potential inputs on outcomes, the estimation method provides estimates of the efficiency of various states in reaching the best possible outcomes. We again have three different estimates of efficiency, one each for the different specifications of the production frontier. As shown in Table 12, for efficiency in net primary enrollment, Chiapas is well below the Mexican state average, but Guerrero and Oaxaca are on par or slightly above the state average. A similar result holds true for the secondary enrollment efficiency measure. For test score efficiency, all three states are roughly on par (or sometimes slightly better) than the Mexico state average. Graphs providing the efficiency measures for all the states are provided in Annex 1, as was done for health.

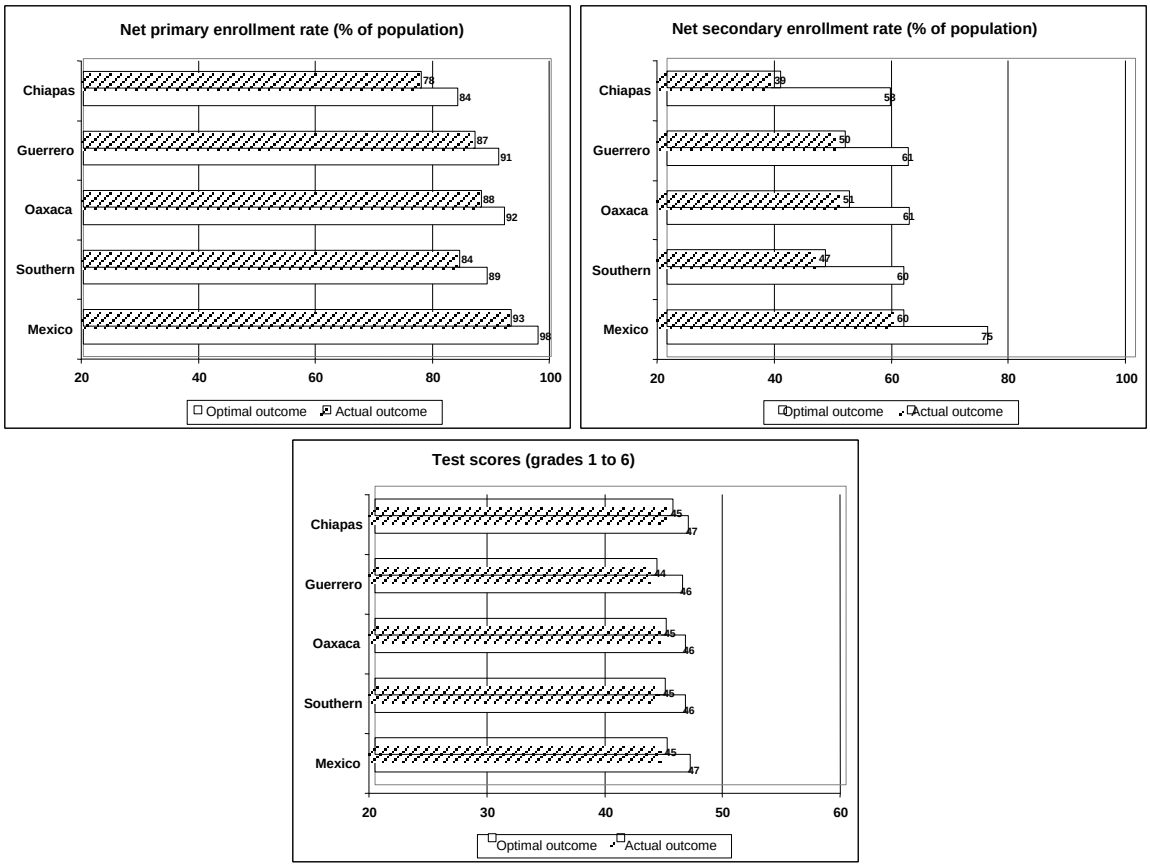
Table 12. Efficiency Measures for Enrollment Rates and Test Scores

	State	*Southern*	*Chiapas*	*Guerrero*	*Oaxaca*
Net primary enrollment, model I	95.39	94.71	92.65	95.59	95.90
Net primary enrollment, model II	96.28	95.74	94.28	96.35	96.59
Net primary enrollment, model III	95.66	95.00	93.10	95.81	96.09
Net secondary enrollment, model I	80.84	77.78	67.69	82.37	83.28
Net secondary enrollment, model II	79.26	77.28	67.10	82.06	82.67
Net secondary enrollment, model III	80.89	77.82	67.76	82.38	83.32
Test scores (grades 1 to 6), model I	95.85	96.38	97.34	95.29	96.50
Test scores (grades 1 to 6), model II	95.91	96.49	97.45	95.43	96.60
Test scores (grades 1 to 6), model III	95.81	96.46	97.53	95.34	96.52

Source: Authors' estimation.

The net primary enrollment, net secondary enrollment, and test score data presented below in Figure 2 provide the actual and optimal outcomes for Chiapas, Guerrero, Oaxaca, and the averages for Mexico and for the southern states. Broadly speaking, with the exception of net enrollment rates in Chiapas, low levels of inputs rather than high inefficiencies in using existing inputs explain most of the lags observed in the south. But, as already mentioned for health indicators, this does not mean that there is no scope for efficiency gains (the benchmark for the comparison of efficiency of southern states is other states, and there may be scope for efficiency gains throughout Mexico that are not captured in our analysis). Also, since broad increases in public spending are not likely to have a large impact on outcomes, targeted programs may be the option, and here again programs such as PROGRESA should be part of the answer (the evaluation of PROGRESA also suggests important gains in education, especially at the secondary level).

Figure 2. Actual and Optimal Outcomes for School Enrollment and Test Scores



Source: Authors.

VI. Moving Forward: Smart-Targeted Programs and Local Capacity Building

Several conclusions emerge from the analysis presented in this Note. First, the southern states may not be able to reduce extreme poverty by half by 2015, and they also lag behind in a wide range of other indicators related to education, health, and access to basic infrastructure. Second, broad-based per capita spending on education or health may have little impact on outcomes. Third, in the state of Guerrero for health and in the state of Chiapas for school enrollment rates, apart from low levels of inputs, inefficiencies in using existing inputs explain part of the lags observed vis-à-vis other Mexican states. Given these findings, a development strategy for the south should emphasize the role that must be played by smart-targeted programs, but it should also emphasize capacity building at the municipal and state levels to improve efficiency.

An example of a smart-targeted program is PROGRESA. As already noted in the Poverty Note, PROGRESA is well targeted through a three-stage targeting mechanism consisting of the selection of communities in which the program is implemented, the selection of beneficiary households in these communities, and the (little used) possibility for local authorities to suggest changes in the list of beneficiaries to the administrators of the program. Additionally, three features of the program are worth emphasizing here in relationship to the targets in the MDGs:

- **Integrated program benefits**. Interventions to improve the education, health, and nutrition of children in poverty are known to have potential for long-term positive impacts on well-being. PROGRESA's originality is that it is trying to build synergies among education, health, and nutrition. Synergies may arise because of economies of scope in providing the interventions or because of cumulative effects of various types of interventions on outcomes. The cumulative effects may be concurrent, as when current dietary intakes increase the effectiveness of current time in school learning. They may also arise with a lag, as when infant malnutrition affects adult productivity (Behrman 2000).

- **Conditionality and long-term gains in human capital.** PROGRESA benefits are conditional in order to promote behavioral changes among program beneficiaries. The children must attend school for 85 percent of school days to qualify for school transfers, which has probably helped to increase impacts on enrollment. According to Schultz (2000), the program has succeeded in increasing primary school enrollment by 0.96 to 1.45 percentage points for girls, and by 0.74 to 1.07 points for boys. In secondary school, where preprogram enrollment rates were lower, the proportional increases have been 11 to 14 percent for girls and 5 to 8 percent for boys. There are also conditionalities in health and nutrition. To receive food transfers, households must attend mandatory healthcare meetings and visits to public clinics, which include growth monitoring, preventive yearly physical exams, and monthly sessions on health and well-being issues. Thanks to PROGRESA, prenatal care visits increased by 8 percent in the first trimester of pregnancy (Gertler 2000), which was documented to have a significant effect on the health of babies and pregnant mothers. These conditionalities, or rather the positive changes promoted by the program, are likely to generate large future gains in well-being.[3]

- **Gender focus.** A third interesting feature is related to gender, intrahousehold allocations, and power structures. PROGRESA transfers are directed toward households as the program starts from the idea that poverty is the result of inadequate family and individual capabilities, yielding low levels of social functioning. But in addition, the cash transfers accrue to the women in the households, as the intrahousehold literature has

[3] Consider for example the education component of PROGRESA (Wodon and others 2003). The long-term "income multiplier" effect of the investments in the education of children can be computed as follows. Consider a boy receiving stipends and other direct benefits for seven years (grade 3 of primary school to grade 9 of secondary school), at a cost of 13,170 pesos in 1999. If administrative costs are 9 percent of outlays, total cost is 14,473 pesos (13,170/0.91). The boy may expect an increase in schooling of 0.64 year attributable to PROGRESA, with a return of 8 percent per additional year of schooling. Assuming the boy migrates to urban areas upon adulthood (and thereby earns an urban wage), and using a discount rate of 5 percent per year, the net present value of future earning gains can be estimated at 102,000 pesos (taking into account the probability of working and the age profile of earnings). This yields a multiplier of 7 (102,000/14,473). But some boys will remain in rural areas where wages are lower. The estimation also does not account for losses in child labor wages and other costs (for example, private costs of schooling). For girls, the increase in years of schooling is larger, but labor force participation and thus future wages are lower, while program costs are larger (stipends are higher for girls in secondary school). All in all, a multiplier of 5 for boys and girls taken jointly may well be realistic (this value is presented only for illustration; more detailed estimates could be provided). In other words, an investment in program costs of 1 peso today is probably worth 5 pesos in future discounted benefits for the program's beneficiaries.

shown that they will focus expenditures more toward children's health and consumption. Furthermore, recognizing the gender bias in schooling decisions for secondary school enrollment, transfers are higher for girls than for boys. These and other provisions give the program a strong gender focus in its delivery mechanism.

PROGRESA is not the only program targeted to the poor in Mexico, but it has become the largest, especially in the southern states, and it is the only program for which detailed evaluation results are available (the reader is referred to the in-depth evaluation of the program by IFPRI at www.ifpri.org, Skoufias 2002). While this warrants the above summary of key impacts, our emphasis on PROGRESA as an example of a successful program in the south does not mean that other programs could not and should not be implemented (see, for example, the Indigenous Note and the role of initiatives related to land and institutions, among others).

Before concluding, going back to the issue of efficiency, we would like to emphasize one point related to capacity building. As noted by Christiaensen, Scott, and Wodon (2002), when assessing whether development targets are realistic, one important aspect concerns the authorities' capacity to implement programs, not only at the federal level, but also at the state and local levels. According to Bevan (2001), financial sustainability refers to whether a planned expenditure path can be funded without unacceptable financing consequences for either the public or private sectors. This relates to acceptable levels of budgetary deficits at various levels of government.

By contrast, absorptive sustainability refers to whether a planned expenditure path can be implemented, even if it can be financed. This relates to the capacity to implement programs in a satisfactory way. For example, as mentioned elsewhere (for example, in the Migration and Federalism Notes), large sums of money are now being transferred to states and municipalities through a social fund using a propoor formula based on the so-called *Masa Carencial Municipal* (Municipal Deficit Level). The formula has dramatically increased the available social infrastructure funding for the poorest states and, within these states, the poorest municipalities. However, mechanisms to properly monitor the allocation of funds within municipalities have yet to be found. Many local governments are probably lacking the expertise and personnel to manage the funds, and sufficient resources have not yet been made available to help them increase their operating budgets, hire new staff or train existing staff, and modernize their administration.

In the broader context of the impact that gains in efficiency could have on education and health indicators, capacity building for municipalities and states in administering decentralized funds will be key. Indeed, at the cross-country level, the issues of governance and the quality of the bureaucracy have been shown to be key determinants of the efficiency in improving education and health indicators (see Box 4). The same is likely to be true within Mexico.

Box 4. What Is Driving Efficiency? Results from a Cross-Country Analysis

Governments aiming to improve the education and health status of their populations can increase the level of public spending allocated to these sectors, or improve the efficiency of public spending. Since increasing spending is often difficult because of a limited tax base, improving the efficiency of public spending becomes crucial. To improve this efficiency, governments have at least two options. The first consists of changing the allocation mix of public expenditures. For example, Murray, Kreuser, and Whang (1994) argue that by reallocating resources to cost-effective interventions, Sub-Saharan African countries could improve health outcomes dramatically. The second option is more ambitious: it consists of implementing wide-ranging institutional reforms to improve variables such as the overall level of bureaucratic quality and corruption in a country, with the hope that this will improve the efficiency of public spending for the social sectors, among other things.

In a recent paper for the World Bank's *World Development Report*, Jayasuriya and Wodon (2002) use stochastic production frontier estimation methods to compare the impact of the level of public spending on education and health outcomes on the one hand, and the efficiency in spending on the other hand, using life expectancy and net enrollment in primary school as outcome indicators. After estimating efficiency measures at the country level, the authors analyze in a second step how the quality of the bureaucracy, corruption, and urbanization affect efficiency. They find that urbanization, the quality of the bureaucracy, and to some extent the level of corruption are strong determinants of the efficiency of countries in improving education and health outcomes.

The institutional variables, that is, the corruption and bureaucratic quality indices, were obtained from the *International Country Risk Guide* (ICRG) published by Political Risk Services (www.icrgonline.com). The ICRG indices are subjective assessments based on an analysis by a worldwide network of experts. To ensure coherence and cross-country comparability, these indices are subject to a peer review process. The corruption index measures actual or potential corruption within the political system, which distorts the economic and financial environment, reduces government and business efficiency by enabling individuals to assume positions of power through patronage rather than ability, and introduces inherent instability in the political system. The bureaucratic quality index measures the strength and expertise of the bureaucrats and their ability to manage political alterations without drastic interruptions in government services or policy changes. For the corruption index, higher values indicate a decreased prevalence of corruption. For the bureaucratic quality index, higher values indicate the existence of greater bureaucratic quality.

Together, the level of corruption of a country, the quality of its bureaucracy, and its level of urbanization explain half of the variation in efficiency measures between countries in improving health and education outcomes. Although such analysis cannot be replicated within Mexico (because good measures of corruption and the quality of the bureaucracy are not available at the state level), broadly similar results might well be found to apply in terms of uncovering some of the key determinants of state-level efficiency.

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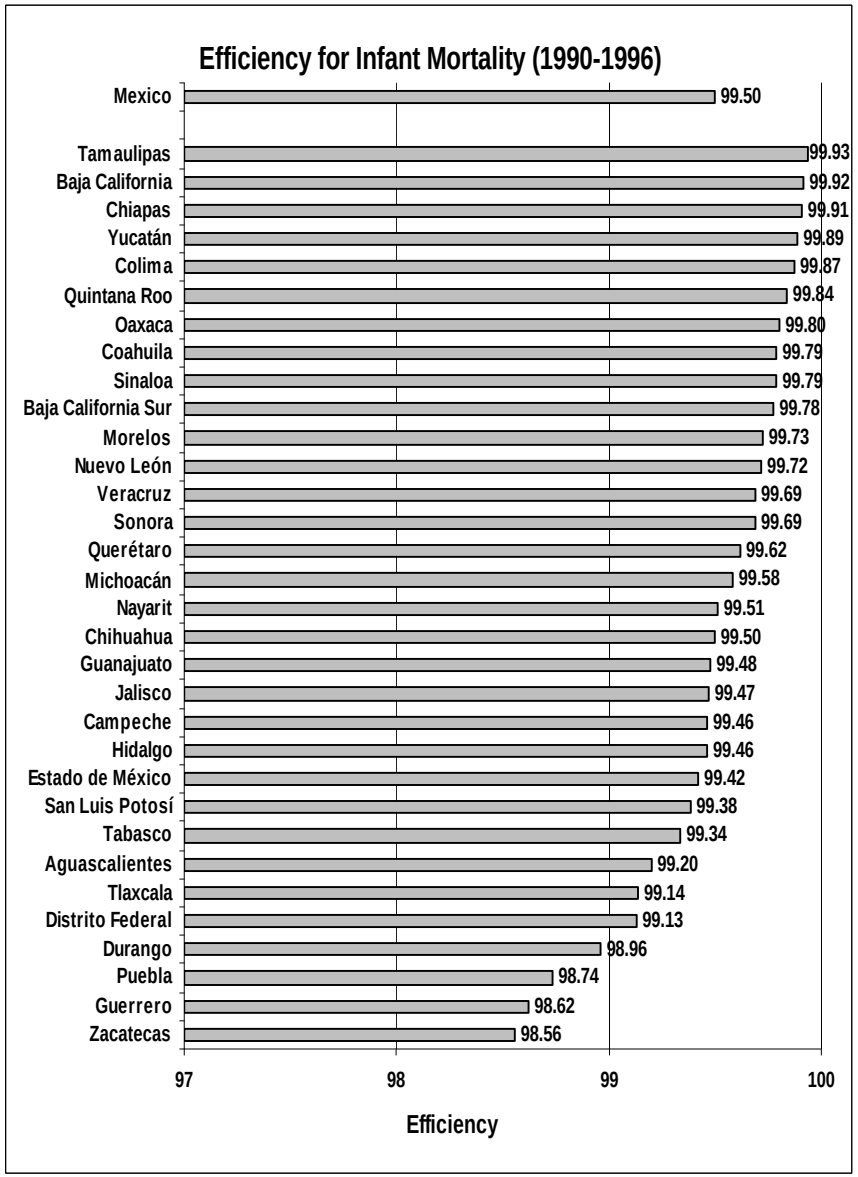
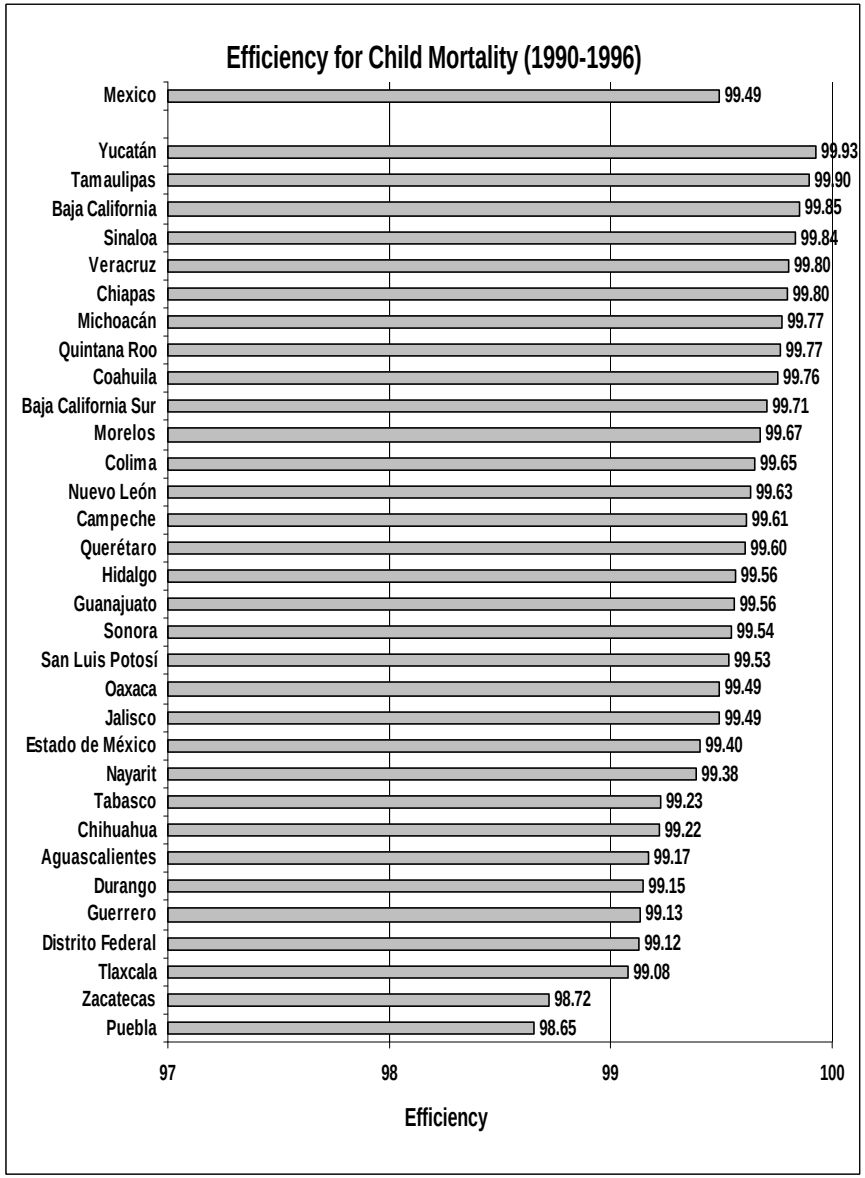
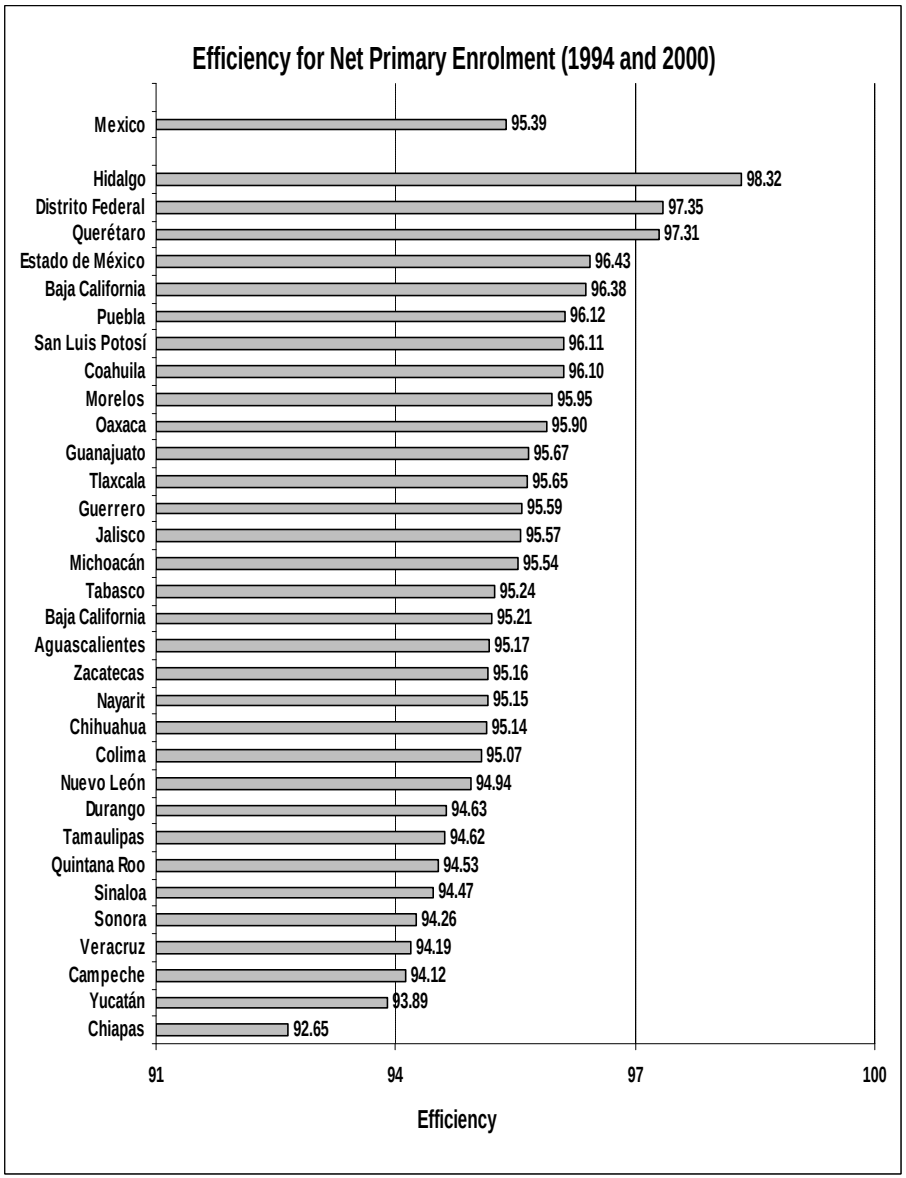
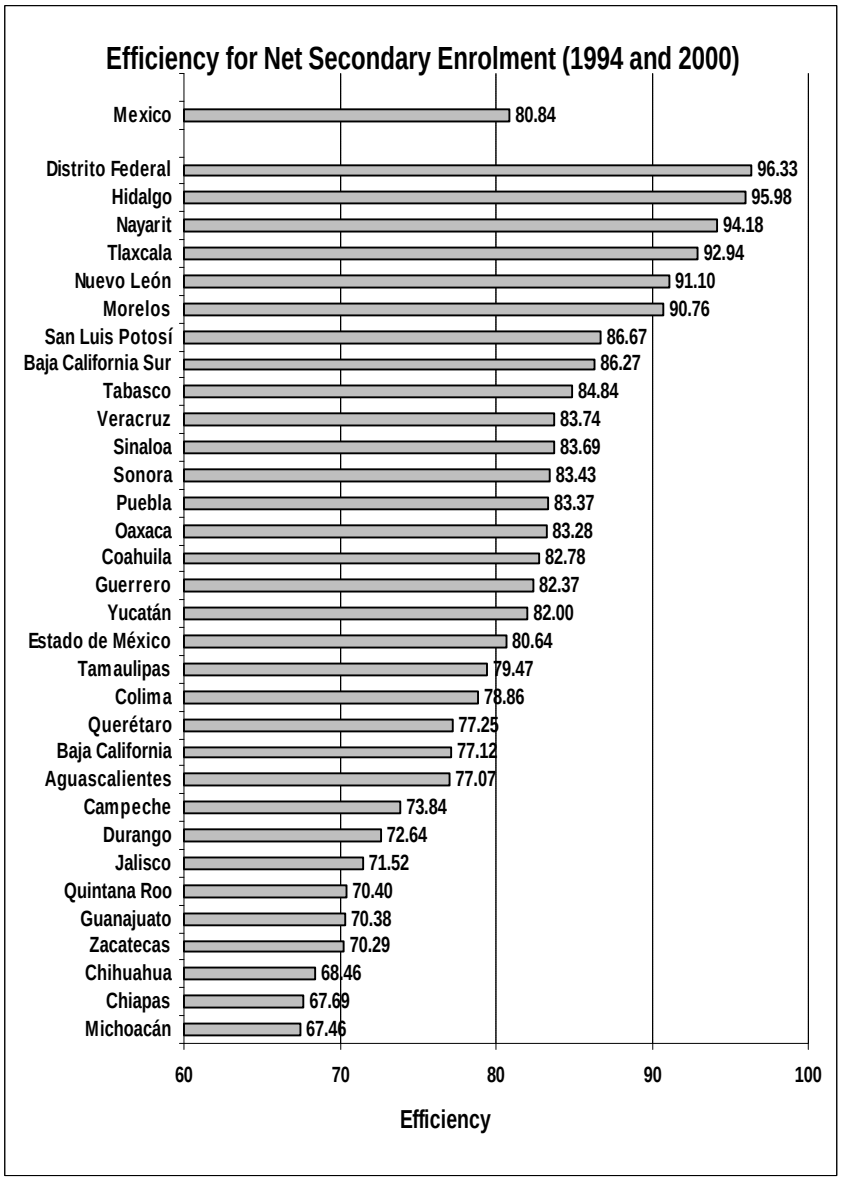
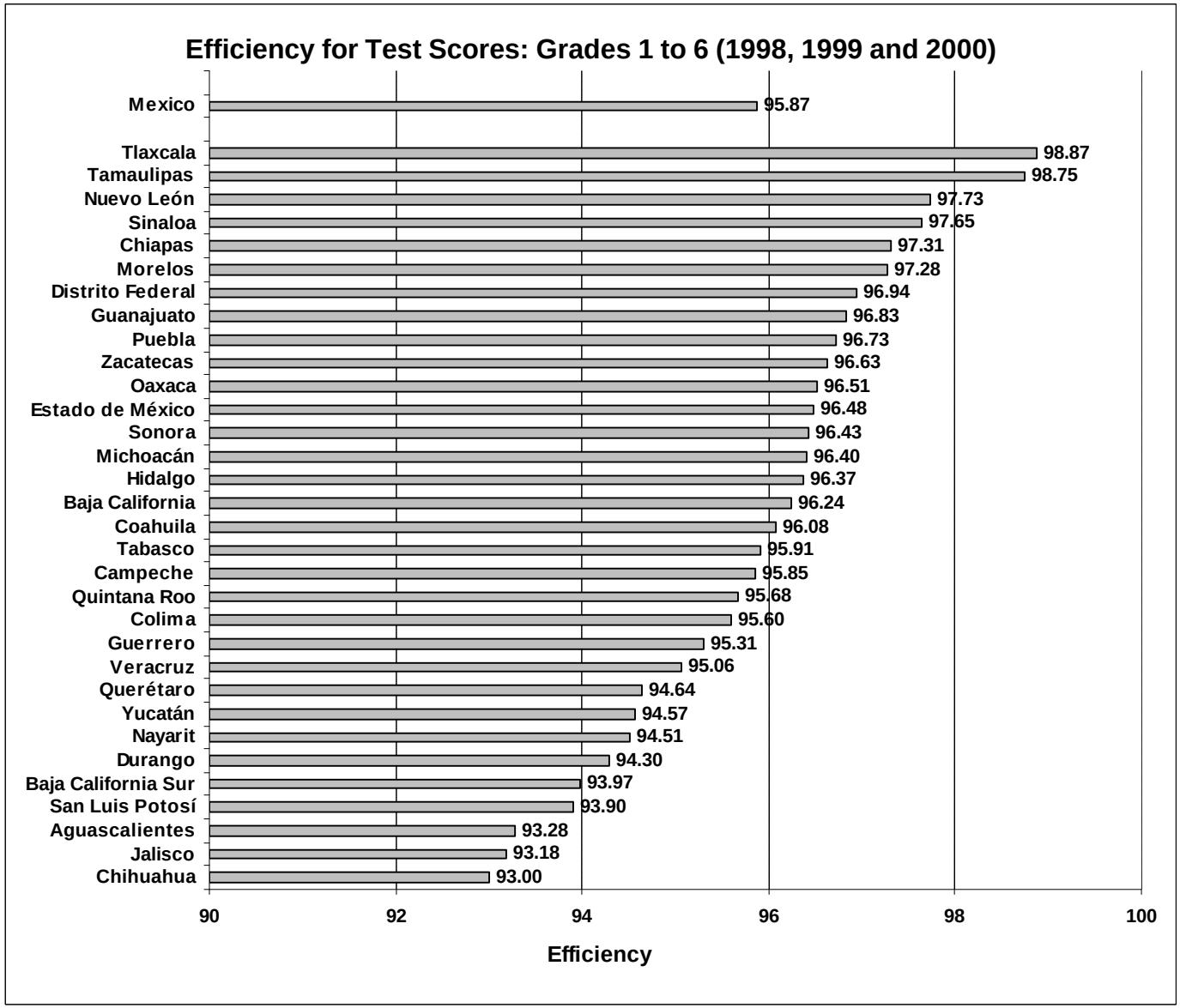
Annex 1. State-Level Efficiency Measures for Health and Education Indicators (Source: Authors' estimates)






Efficiency for Net Primary Enrolment (1994 and 2000)
Mexico 95.39
Hidalgo 98.32
Distrito Federal 97.35
Querétaro 97.31
Estado de México 96.43
Baja California 96.38
Puebla 96.12
San Luis Potosí 96.11
Coahuila 96.10
Morelos 95.95
Oaxaca 95.90
Guanajuato 95.67
Tlaxcala 95.65
Guerrero 95.59
Jalisco 95.57
Michoacán 95.54
Tabasco 95.24
Baja California 95.21
Aguascalientes 95.17
Zacatecas 95.16
Nayarit 95.15
Chihuahua 95.14
Colima 95.07
Nuevo León 94.94
Durango 94.63
Tamaulipas 94.62
Quintana Roo 94.53
Sinaloa 94.47
Sonora 94.26
Veracruz 94.19
Campeche 94.12
Yucatán 93.89
Chiapas 92.65
91
94
97
100
Efficiency


Efficiency for Net Secondary Enrolment (1994 and 2000)
Mexico 80.84
Distrito Federal 96.33
Hidalgo 95.98
Nayarit 94.18
Tlaxcala 92.94
Nuevo León 91.10
Morelos 90.76
San Luis Potosí 86.67
Baja California Sur 86.27
Tabasco 84.84
Veracruz 83.74
Sinaloa 83.69
Sonora 83.43
Puebla 83.37
Oaxaca 83.28
Coahuila 82.78
Guerrero 82.37
Yucatán 82.00
Estado de México 80.64
Tamaulipas 79.47
Colima 78.86
Querétaro 77.25
Baja California 77.12
Aguascalientes 77.07
Campeche 73.84
Durango 72.64
Jalisco 71.52
Quintana Roo 70.40
Guanajuato 70.38
Zacatecas 70.29
Chihuahua 68.46
Chiapas 67.69
Michoacán 67.46
60
70
80
90
100
Efficiency


Efficiency for Test Scores: Grades 1 to 6 (1998, 1999 and 2000)
Mexico 95.87
Tlaxcala 98.87
Tamaulipas 98.75
Nuevo León 97.73
Sinaloa 97.65
Chiapas 97.31
Morelos 97.28
Distrito Federal 96.94
Guanajuato 96.83
Puebla 96.73
Zacatecas 96.63
Oaxaca 96.51
Estado de México 96.48
Sonora 96.43
Michoacán 96.40
Hidalgo 96.37
Baja California 96.24
Coahuila 96.08
Tabasco 95.91
Campeche 95.85
Quintana Roo 95.68
Colima 95.60
Guerrero 95.31
Veracruz 95.06
Querétaro 94.64
Yucatán 94.57
Nayarit 94.51
Durango 94.30
Baja California Sur 93.97
San Luis Potosí 93.90
Aguascalientes 93.28
Jalisco 93.18
Chihuahua 93.00
90
92
94
96
98
100
Efficiency